

AVVISO DI SEMINARIO

Martedì 18 settembre, alle ore 15:00, nell'aula G (ex Psicologia) del Dipartimento di Matematica e Fisica dell'Università degli Studi della Campania "Luigi Vanvitelli", il Professor Miroslav Tůma, della Charles University (Praga), terrà un seminario dal titolo

The sparse-dense linear least-squares problems

Abstract

Large-scale linear least-squares (LS) problems occur widely, arising both in their own right and as subproblems of nonlinear least-squares problems. Our focus is on the following $m \times n$ ($m > n$) LS problem

$$\min_x \|Ax - b\|_2 = \min_x \left\| \begin{pmatrix} A_s \\ A_d \end{pmatrix} x - \begin{pmatrix} b_s \\ b_d \end{pmatrix} \right\|_2,$$

in which each row of the $m_d \times n$ block A_d is considered to be dense and A_s is $m_s \times n$ with $m_s \gg m_d \geq 1$; the vector b is partitioned conformally. It has long been recognised that the effectiveness of sparse matrix techniques for directly solving such problems is severely limited by the presence of the dense rows. Our interest is primarily in using preconditioned iterative methods. In this talk, we will consider a number of preconditioning strategies for handling mixed sparse-dense LS problems and illustrate their effectiveness using problems from practical applications.

This is joint work with Jennifer A. Scott (University of Reading and STFC Rutherford Appleton Laboratory, UK).

References

- [1] J. A. Scott and M. Tůma. Solving mixed sparse-dense linear least-squares problems by preconditioned iterative methods. *SIAM J. on Scientific Computing*, 39(6):A2422–A2437, 2017.
- [2] J. A. Scott and M. Tůma. A Schur complement approach to preconditioning sparse linear least-squares problems with some dense rows. *Numerical Algorithms*, online 2018, <https://doi.org/10.1007/s11075-018-0478-2>.

La proponente
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